

Report of the American Found.
F/4 Blind Committee on the

REDUCTION OF COST OF BRAILLE
PUBLISHING

AV 1669
A copy 2

AV 1669
A copy 2



**M.C. MIGEL LIBRARY
AMERICAN PRINTING
HOUSE FOR THE BLIND**

on the

REDUCTION OF COST OF BRAILLE PUBLISHING

August 4, 1924

HV1669
A44
copy 1

The Committee on the Reduction of Cost of Braille Publishing organized under the chairmanship of the Director of Research of the American Foundation for the Blind, has been working for some time on ways and means of reducing the cost of production of embossed books.

The personnel of this committee was selected in the belief, first, that technical men from the various Braille embossing establishments might be mutually helpful to one another in finding ways and means of reducing the cost of Braille publishing. Second, that persons from kindred industries might have valuable suggestions to contribute toward the solution of this problem. Accordingly, the following committee was assembled:

E.E. Bramlette	Supt. of the American Printing House for the Blind
Edward M. Van Cleve	Principal, New York Institute for the Education of the Blind, and Vice President of the Board of Trustees of the American Printing House for the Blind.
Frank C. Bryan	Manager of the Howe Memorial Press
Thomas Lister	Embossor at the New York Institute for the Blind
Walter G. Holmes	Manager of the Matilda Ziegler Magazine for the Blind
Joseph Brusca	Matilda Ziegler Magazine for the Blind
Miss Lucille Goldthwaite	Librarian, N.Y. Public Library, Dept. for the Blind, and Chairman of the A.L.A. Committee on Work for the Blind.
Mrs. Leila Heyn	Touch Reader and Psychologist
E. W. Palmer	President, J.T. Tapley Co., Book Manufacturers
A. V. Howland	Representative of Tileston & Hollingsworth Co., Paper Manufacturers
J. C. Liebenow	Special Representatives Thomson National Press Co., Book Manufacturers.
Wm. G. Schneider	Representing the Copper and Brass Research Ass'n.
C. I. Sprowl	Expert on Sheet Metal

At the first meeting of the committee held in New York City on March 13th, it was decided that there were three major ways in which the cost of Braille embossing might possibly be reduced. First, By standardizing the size of page so that joint purchasing of paper, bindings, etc., by the various publishing houses, might be carried out. Second, By adopting a size of volume which would make possible the use of the labor-saving machinery generally employed in book binding establishments. Third, By the use of two-side printing. There were also certain minor ways in which it was believed that the cost of Braille publishing might be reduced, such as the saving of space by omitting the title of the book from the top of each page, the substitution of uniform interval Braille for block Braille, and the substitution of less expensive paper for that now employed.

of the

REVISION OF COST OF BRAILLE PUBLISHING

August 4, 1924

The Committee on the Reduction of Cost of Braille Publishing organized under the chairmanship of the Director of Research of the American Foundation for the Blind, has been working for some time on ways and means of reducing the cost of production of embossed books.

The personnel of this committee was selected in the belief that, from technical men from the various Braille embossing establishments might be obtained help in one another in finding ways and means of reducing the cost of Braille publishing. Second, that persons from diverse industries might have valuable suggestions to contribute toward the solution of this problem. Accordingly, the following committee was assembled:

- Frank C. Bryan Editor of the American Printing House for the Blind
- Edward M. Van Cleave Principal, New York Institute for the Education of the Blind, and Vice President of the Board of Trustees of the American Printing House for the Blind
- Manager of the How Memorial Press
- Embossist at the New York Institute for the Blind
- Manager of the Matthews Electric Magazine for the Blind
- Matthews Electric Magazine for the Blind
- Librarian, N.Y. Public Library, Dept. for the Blind, and Chairman of the A.B.A. Committee on work for the Blind
- Travis B. Smith and Psychologist
- President, J.T. Taylor Co., Book Manufacturers
- Representative of Robinson & Hollenbeck Co., Paper Manufacturers
- Special Representative Thompson National Press Co., Book Manufacturers
- Representing the Cooper and House Presses, Inc.
- Expert on Sheet Metal

At the first meeting of the committee held in New York City on November 11th, it was decided that there were three major ways in which the cost of Braille embossing might possibly be reduced. First, by standardizing the size of type so that joint purchasing of paper, bindings, etc., by the various publishing houses might be carried out. Second, by adopting a size of volume which would make possible the use of the labor-saving machinery generally employed in book binding establishments. Third, by the use of two-color printing. There were also certain minor ways in which it was believed that the cost of Braille publishing might be reduced, such as the saving of space by setting the title of the book from the top of each page. The consideration of matters relating to Braille for book binding and the adoption of less expensive paper for book binding were also suggested.

After the March 13th meeting the committee was divided into sub-committees to study the various possible lines of economy and improvements suggested at the first meeting. Several members of the committee gave much time to conducting experiments and calculating results. The Director of Research worked with each sub-committee.

On August 4th the committee met in New York City and adopted the following report:

Standardization of Size

The question of standardization on a particular size of volume depends largely upon whether or not the publishers, librarians and readers can agree upon a satisfactory size. We find the librarians are not very particular about the dimensions of the volumes, provided that they are approximately uniform in size. Generally speaking, they prefer a small volume if it contains sufficient material to make great multiplicity of volumes in a single work unnecessary.

Of the 112 readers interviewed on the subject of size of volume -

18 children and 15 adults	expressed no preference
25 " " 39 "	expressed a preference for small volumes
9 " " 6 "	" " " " large "

To summarize - 33 are indifferent as to size of volumes
64 prefer volumes of small size
15 " " " large "

It is the opinion of the committee and of many persons interviewed that books printed on both sides of the page should contain comparatively short lines. This is desirable in order to obviate an undue amount of shifting of the book from side to side as the right and left pages are being read. This is especially important in view of the fact that outside of institutions and class-rooms, the great majority of readers hold the books on their laps while reading. The committee is of the opinion that for lap reading the top line of the text should not be more than twelve inches from the bottom of the page. Allowing a minimum of a half-inch top margin, this would indicate that the desirable height of page is about $12\frac{1}{2}$ inches.

Economical Size

As to the selection of a size of volume well adapted to book binding machinery, the bindery member of the committee reports that the book when open may not have a spread of more than 22 inches and the page may not exceed $13\frac{1}{2}$ inches in height and 10 inches in width. This means that if we adopt a page measuring $13\frac{1}{2}$ inches in height and 10 inches in width, and bind the books on the long side of the page, and restrict the size of our volume to an inch and a half in thickness, we can come within the limits of book binding machinery. Practically speak-

ing, this means restricting our pages to about 31 lines of about 34 letters to a line. The standard maximum size of the Louisville page is 31 lines of 40 letters to a line. The standard Howe Memorial Press page is 24 lines to the page and 44 letters to the line; the standard Howe Publishing Society page is 23 lines to the page and 40 letters to the line; the Ziegler Magazine page is 27 lines to the page and 46 letters to the line (Block Braille); the standard Universal Braille Press page 33 lines to the page and 50 letters to the line.

Interpointing

In two-side printing, there are four questions involved:

- A. Is two-side printing equally legible with one-side printing?
- B. Does two-side printing actually reduce bulk?
- C. Is the cost of producing interpointed books less than that of producing books in one-side printing?
- D. Are interpointed books equally durable with books printed on one side of the page?

A. Relative Legibility of one and two-side printing.

So far as the committee is aware, no thorough-going investigation of the relative legibility of one and two-side printing has heretofore been made. This form of printing has been in vogue in Europe for many years but in America no considerable amount of two-side printing has been done in Braille outside of that done at the publishing plant of the Matilda Ziegler Magazine. So far as sight is concerned, it is very difficult to read two-side printing with the eye, as it is not easy to distinguish between raised dots and the pits made by dots on the reverse side. For this reason it is the opinion of the committee that books such as those for beginners, upon which the teacher and pupil must work together, should not be embossed by the two-side method.

In order that the committee might have reliable data upon which to base a judgment, the American Foundation for the Blind employed Mrs. Leila H. Heyn, a trained psychologist, to conduct a series of careful tests with a considerable number of child and adult readers. The question to be tested was: Is interpointed Braille literature read with as much speed and with as high a degree of accuracy as is one-side printing? After trying out several forms of tests, with various procedures, the following test was determined upon:

One hundred easy words from a second reader were selected. These words were printed in full spelling in non-sense order upon one sheet in one-side printing, and upon another sheet in different non-sense orders in two-side printing. That is to say, on the second sheet the one hundred words were placed on each side of the sheet in different orders. Exact copies of these sheets were made line for line in typewriting. Schools, workshops, homes and private residences were then

and 46 letters to the line (Black Braille); the standard Universal Braille Press page 17 lines to the page and 30 letters to the line.

page 17 lines to the line; the standard Howe Publishing Society page is 27 lines to the page and 40 letters to the line; the Knicker Magazine page is 27 lines to the page and 40 letters to the line; the standard Howe Memorial Press page is 24 lines to the page and 44 letters to the line. The standard maximum size of the Leedsville page is 21 lines of 40 letters to a line. This means restricting our pages to about 21 lines of about 40 letters to a line.

Interpointing

In two-side printing, there are four questions involved:

- A. Is two-side printing equally legible with one-side printing?
- B. Does two-side printing actually reduce bulk?
- C. Is the cost of producing interpointed books less than that of producing books in one-side printing?
- D. Are interpointed books equally durable with books printed on one side of the paper?

A. Relative Legibility of one and two-side printing

So far as the committee is aware, no thorough-going investigation of the relative legibility of one and two-side printing has heretofore been made. This form of printing has been in vogue in Europe for many years but in America no considerable amount of two-side printing has been done in Braille outside of that done at the publishing plant of the National Knicker Magazine. So far as sight is concerned, it is very difficult to read two-side printing with the eye, as it is not easy to distinguish between raised dots and the pits made by dots on the reverse side. For this reason it is the opinion of the committee that books such as those for beginners, upon which the teacher and pupil must work together, should not be imposed by the two-side method.

In order that the committee might have reliable data upon which to base a judgment, the American Foundation for the Blind employed Mrs. Lella R. Hays, a trained psychologist, to conduct a series of careful tests with a considerable number of child and adult readers. The question to be tested was: Is interpointed Braille literature read with as much speed and with as high a degree of accuracy as is one-side printing? After trying out several forms of tests, with various procedures, the following test was determined upon:

One hundred easy words from a second reader were selected. These words were printed in full spelling in non-sense order upon one sheet in one-side printing, and upon another sheet in different non-sense order in two-side printing. That is to say, on the second sheet the one hundred words were placed on each side of the sheet in different orders. Exact copies of these sheets were made like the line in typewriting. Records, verbatim, names and private notations were then

visited wherever blind readers could be found. (See Appendix N). These readers were asked to read these lists of words aloud, Mrs. Heyn keeping the time with a stop-watch and following a Braille copy, while her assistant followed the type-written copy and noted errors. Careful records were made of both time and errors with each subject. One side of the interpointed sheet was used as a practice sheet in order to put the reader at his ease. The subject was next asked to read either the opposite side of the interpointed page which will be known through this report as page "B", or the page of one-side printing which will be known as page "A". Care was taken to alternate the pages used by successive subjects. For instance, the first reader began with page "B", the second reader with page "A", the third reader with page "B", the fourth reader with page "A", etc.

Many readers had to be rejected because of some condition which vitiated the test. Either there was an interruption, a strong emotional element, or possibly the subject read so slowly that it amounted to simply spelling out of words rather than of reading. No record was accepted where the subject read less than an average of 12 words per minute. Test sheets were laid in a book or on a pile of other embossed material while being read. This was done to obviate the possibility of an unfavorable condition which would militate against the legibility of two side printing, for certain members of the committee felt that two side printing when laid on an even, hard surface might not be so easily read as one side printing.

Satisfactory records were obtained from 52 children and 56 adults. An analysis of the results of these tests shows the following:

The total length of time required for the 108 readers	
to read page "A" was	241 Mins. 40 Secs.
The total length of time required for the 108 readers	
to read page "B" was	246 " 46 "

a total retardation in speed of two-side printing over one-	
side printing of	5 Mins. 6 Secs. or 2.1%

The median retardation in the case of the 108 readers was 2 secs. or .77 of 1%
(See Appendices C & F)

The average length of time required by 108 readers	
to read page "A" was	2 Mins. 14 Secs.
The average length of time required by 108 readers	
to read page "B" was	2 " 17 "

or an average retardation of	3 Secs.
--	---------

In order to ascertain whether or not the reaction of children is any different from that of adults, the data have been separated. From this we find in the case of children the following:

visited whenever blind readers could be found. (See Appendix II). These readers were asked to read these lists of words aloud, Mrs. May keeping the time with a stop-watch and following a Braille copy, while her assistant followed the type-written copy and noted errors. Careful records were made of both time and errors with each subject. One side of the interpointed sheet was used as a practice sheet in order to put the reader at his ease. The subject was next asked to read either the opposite side of the interpointed page which will be known as page "A", or as page "B", or the page of one-side printing which will be known as page "A". Care was taken to alternate the pages used by successive subjects. For instance, the first reader began with page "B", the second reader with page "A", the third reader with page "B", the fourth reader with page "A", etc.

Many readers had to be rejected because of some condition which vitiated the test. Either there was an interruption, a strong emotional element, or possibly the subject read so slowly that it amounted to simply spelling out of words rather than of reading. No record was accepted where the subject read less than an average of 15 words per minute. Test sheets were laid in a book or on a pile of other embossed material while being read. This was done to obviate the possibility of an unfavorable condition which would vitiate against the legitimacy of two side printing, for certain members of the committee felt that two side printing when laid on an even, hard surface might not be so easily read as one side printing.

Satisfactory records were obtained from 25 children and 25 adults. An

analysis of the results of these tests shows the following:

The total length of time required for the 108 readers to read page "A" was 2 Mins. 40 Secs.	The total length of time required for the 108 readers to read page "B" was 2 Mins. 46 Secs.
A total retention in speed of two-side printing over one-side printing of 2 Mins. 6 Secs. or 2.1%	

The median retention in the case of the 108 readers was 2 sec. or .17 of 1% (See Appendices C & D)

The average length of time required by 108 readers to read page "A" was 2 Mins. 14 Secs.	The average length of time required by 108 readers to read page "B" was 2 Mins. 17 Secs.
or an average retention of 3 Secs.	

In order to ascertain whether or not the reaction of children is any different from that of adults, the data have been separated. From this we find in the case of children the following:

The total length of time in which "A" was read by children was	99 Mins. 13 Secs.
The total length of time in which "B" was read by children was	103 Mins. 22 Secs.
a total retardation in speed of two-side printing over one-side printing of	4 Mins. 9 Secs. 4.2%

The median retardation in the case of the children was 2 Secs. or .79 of 1%
(See Appendices B & E)

The average length of time required by the children to read page "A" was	1 Min. 54 Secs.
The average length of time required by the children to read page "B" was	1 " 59 Secs.
or an average retardation of	5 Secs.

In the case of the adults, we find -

The total length of time in which "A" was read by adults was	142 Mins. 27 Secs.
The total length of time in which "B" was read by adults was	143 " 24 "
a total retardation in speed of two-side printing over one-side printing of	57 Secs. or .67 of 1%
The median retardation in the case of the adults was 2 seconds, or .79 of 1% (See Appendices A and D)	

The average length of time required by adults to read page "A" was	2 Mins. 33 Secs.
The average length of time required by adults to read page "B" was	2 " 34 "
or an average retardation of	1 second

From this we draw the following conclusions: that there is very little difference in point of speed of reading between one and two-side printing; that this difference is rather more marked among children than adults; that among adults the retardation of speed caused by two-side printing is negligible, being less than 1%. This is possibly due to the fact that the adults, practically all of whom read the Ziegler Magazine, are more familiar with two-side printing than are the children.

An effort has been made to determine what the cause of the slight retardation may be. Inexperienced readers were eliminated from the list and calculations made. (See Appendix M). This affected very little the final results. Slow readers and fast readers were then studied, but the retardation seemed to be no more marked in one group than in the other. It is possible that as two-side printing is perfected and data are collected with a very large number of readers, the retardation will tend to disappear. As a matter of fact when we compare the difference in time required by slow readers as contrasted with fast readers, with the difference in time of reading between one and two-side printing, the difference between the two styles of printing sinks into insignificance. For instance, the retardation of

The total length of time in which "A" was read by children was 29 Mins. 27 Secs.
 The total length of time in which "B" was read by children was 103 Mins. 28 Secs.
 The total length of time in which "C" was read by children was 103 Mins. 28 Secs.
 The total length of time in which "D" was read by children was 103 Mins. 28 Secs.

The median retardation in the case of the children was 2 Secs. or .17 of 1% (See Appendixes A & B)

The average length of time required by the children to read page "A" was 1 Min. 14 Secs.
 The average length of time required by the children to read page "B" was 1 " 29 Secs.
 The average retardation of 2 Secs.

In the case of the adults we find -

The total length of time in which "A" was read by adults was 143 Mins. 27 Secs.
 The total length of time in which "B" was read by adults was 143 " 27 "

A total retardation in speed of two-side printing over one-side printing of 27 Secs.
 or .07 of 1% of 1% (See Appendixes A and B)

The average length of time required by adults to read page "A" was 1 Min. 14 Secs.
 The average length of time required by adults to read page "B" was 1 " 29 Secs.
 The average retardation of 1 second

From this we draw the following conclusions: that there is very little difference in point of speed of reading between one and two-side printing; that the retardation of speed caused by two-side printing is negligible, being less than 1%. This is possibly due to the fact that the adults, practically all of whom read the English language, are more familiar with two-side printing than are the children.

An effort has been made to determine what the cause of the slight retardation may be. Inexperienced readers were eliminated from the first and conclusions and last readers were then studied, but the retardation seemed to be no more marked in one group than in the other. It is possible that as two-side printing is put into general use, the retardation will tend to disappear. As a matter of fact, when we compare the difference in

A difference of 3 Secs.

A difference of 3 Mins. 15.7 "
(See Appendix L)

This would indicate that there are other elements which affect speed of reading vastly more important than the relative legibility of one and two-side printing.

Turning to the consideration of the comparative accuracy of the reading of one and two-side printing, we find an interesting result.

or a difference of 38 in favor of the two-side printing. (See Appendix K). Reducing this to a percentage, we find that there were 25% fewer errors made on the two-side printing than on the one-side printing.

or a difference of 10 errors in favor of the two-side printing. (See Appendix J). Reducing this to a percentage we find that there were 17.8% less errors made on the two-side printing than on the one-side printing.

or a difference of 23 errors in favor of the two-side printing. (See Appendix I). Reducing this to a percentage, we find that there were 29.1% less errors made on the two-side printing than on the one-side printing.

To sum up: Careful tests made with 108 cases show that interpointed material requires slightly more time to read than does one-side printing, the difference

Two-side printing is a one-sided process in that it is not possible to print on both sides of a sheet of paper at the same time. This is because the paper is fed into the press from one side and the ink is applied to one side only. The other side of the paper is left blank.

The standard method of printing is one-side printing. This is because it is the simplest and most economical method. It also allows for the use of a single set of type and a single set of galleys. The standard method of printing is one-side printing.

The standard method of printing is one-side printing. This is because it is the simplest and most economical method. It also allows for the use of a single set of type and a single set of galleys. The standard method of printing is one-side printing.

This would indicate that there are of set elements which affect speed of reading. It is more important than the relative frequency of one and two-side printing.

Comparative Analysis

of one and two-side printing, we find an interesting result. The standard method of printing is one-side printing.

on a difference of 18 in favor of the two-side printing. (See Appendix X) Reducing this to a percentage, we find that there were 28 fewer errors made on the two-side printing than on the one-side printing.

To separate the children from the adults, we find the total number of errors made on page 10 by children is 18 and by adults is 14.

or a difference of 10 errors in favor of the two-side printing. (See Appendix Y) Reducing this to a percentage we find that there were 17.5 less errors made on the two-side printing than on the one-side printing.

The standard method of printing is one-side printing. This is because it is the simplest and most economical method. It also allows for the use of a single set of type and a single set of galleys. The standard method of printing is one-side printing.

is errors in favor of the two-side printing. (See Appendix Z) Reducing this to a percentage we find that there were 17.5 less errors made on the two-side printing than on the one-side printing.

No attempt is made to explain this discrepancy.

being a little more marked among children than among adults. The average retardation of two-side printing over one-side printing, with 108 cases, was 3 seconds, or 2.1%. The median retardation which is perhaps more indicative was 2 seconds, or 77/100 of 1%. From the standpoint of accuracy of reading, the tests show that interpointed material is no less legible than one-side printing.

As to preference of readers for one or two-side printing, we find a marked enthusiasm for two-side printing among many readers. This is based principally upon the fact that this style of printing makes possible a great reduction in bulk. The Ziegler Magazine recently requested an expression of opinion from its readers upon the relative desirability of one or two-side printing. Had there been any marked sentiment against two-side printing in this country, this announcement would have been a signal for a deluge of letters of protest against the style of printing employed in that magazine. It is significant that of the 456 letters received by the Editor, only four expressed a preference for one-side printing. The others enthusiastically endorsed two-side printing.

B. The Relative Bulk of one and two-side Printing.

We find that from the standpoint of paper, 100% more material can be printed on interpointed sheets of a given size by the interpointed method than by the one-side printing method. We have not made sufficient investigation to determine whether or not two side printing requires a heavier paper. From the standpoint of thickness of volume we find that printing on the second side of the page increases the thickness of the volume from 20% to 30%, depending on the height of dot and the kind of paper used. To put this in another way, a book of a given number of words printed in interpointing can be published on about one-half the paper required for one-side printing, and the bulk when printed on two sides of the page will be about 65% of the bulk of the same number of words printed on one side of the page.

C. The Relative Cost of one and two-side Printing.

This brings us to the consideration of cost of production. Assuming that paper of the same weight may be used for the two styles of printing, it is apparent that from the standpoint of material, two-side printing reduces the paper bill about 50% and the bindery bill about 35%.

Press Work. - So far as we can ascertain at present, the cost of labor with an improved press is probably no more in the case of interpointing than in one-side printing. The Thomson National Press has worked out a design of platen press which makes it possible to change a pair of plates in less than a minute. This press may be fed with dry paper at the rate of from 600 to 800 impressions

per hour. The committee is assured by persons in position to know, that cylinder presses may be so designed for two-side printing, that plates may be changed in a negligible period of time. If this can be done, the relative cost of press work for one and two-side printing is approximately identical.

Plate making. - This leaves only the question of plate making. It is probable that it costs more to produce the plates for a given number of words of two-side printing than it does for the same number of words of one-side printing. Just how much more we cannot now state with absolute confidence. No concern in this country, aside from the Ziegler Magazine, has had experience with two-side printing sufficient to be of much value. So far as the actual stamping of the plates is concerned, it takes very little more time to do the second side than the first. The additional time consumed in making interpointed plates is largely in the correcting process. Mr. Joseph Brusca, the Ziegler Magazine operator, is a very accurate worker and he finds few disadvantages in interpoint plate making as compared with one-side plate making. A test made by Mr. Brusca for the Committee on three pairs of plates, showed a retardation in speed of manufacturing a two-side plate over that of producing a one-side plate of 14%. (See Appendix O). The Ziegler Magazine uses sheet iron in the manufacture of most of its plates. It is possible that zinc or some other metal would not warp as much as sheet iron, thus requiring less time for adjustment while stamping the reverse side of the plate. It will probably always be necessary, however, to spend a little more time making corrections on interpointed plates than on one-side plates.

Assuming that with the average operator it will cost 20% more to make the plates for two-side printing than for one-side printing, it is calculated that this difference would be more than offset by the other savings affected by interpointing.

D. Durability

As to durability of interpointed books as compared with those printed on one side of the page - where the books are printed on wet paper, librarians agree that interpointed books are no less durable than are those printed on one side of the page. Most of the interpointed books printed during the past ten years have been done on dry paper. These are doubtless not as durable as those printed on wet paper. Librarians tell us, however, that such books are seldom discarded because the print is no longer legible. The causes for discarding books of this kind are the same as the causes for discarding books printed on wet paper, namely, because the pages are torn, binding has given way or the books have become too soiled to be continued in circulation.

Whether or not dry printing is essential to interpointing is not clear. It was resorted to in Europe, we understand, because dry printing is more economical than wet. There seems to be certain compensating advantages in dry printing. The calendered surface of the paper is not affected by dry printing, leaving a smooth surface much more pleasant to the fingers in long continued reading than the unglazed surface usually resulting from wet printing. The tests secured for this report were printed on dry paper. This was done because in our preliminary work we found that the comparative legibility with 45 readers of wet and dry printing placed the wet printing at a distinct disadvantage in point of speed of reading.

Miscellaneous Considerations.

The committee has conducted some experiments with various kinds of paper. These have not been sufficiently conclusive to justify definite recommendations. It seems probable, however, that less expensive paper can be satisfactorily used in Braille embossing than has generally been used in American books.

Height of Dot.

Some tests were made to determine the relative legibility of high and low dots. This work must be continued, but present indications are that dots 24/1000 of an inch in height are quite as legible as dots 28/1000 of an inch in height. This may prove an important consideration, if dry printing seems advisable in interpointed books.

Color of Paper.

Aside from the books published by the Howe Memorial Press, white paper has been universally used in America in the manufacture of Braille books. While the committee does not wish to encourage the continuance in circulation of Braille books after they have become so soiled as to be objectionable, it seems advisable to the majority of the committee that a slightly tinted paper, which would make finger marks somewhat less conspicuous, should be used. This has an economic importance as well, when we enter the field of cheaper paper.

To summarize: - The committee on the cost of Braille publishing has found that the cost of the manufacture of Braille books may be reduced in the following ways:

- First - standardization in size of volume.
- Second- selecting a size of volume which will adapt itself to labor saving machinery.
- Third - printing by the interpointed method.

Standardization of size is a matter to be worked out among the librarians, publishers and readers. This is a subject on which the committee is still working. The maximum size of book which lends itself well to machine production,

Whether or not the printing is essential to intelligibility is not clear. It was pointed out in Europe, we understand, because dry printing is more costly.

The calculated surface of the paper is not affected by dry printing, leaving a smooth surface which was pleasant to the fingers in long continued reading. The roughened surface usually resulting from wet printing. The tests secured for this report were printed on dry paper. This was done because in our preliminary work we found that the comparative legibility with 15 readers of wet and dry printing placed the wet printing at a distinct disadvantage in point of speed of reading.

Method of Experimentation

The committee has conducted some experiments with various kinds of paper. These have not been sufficiently conclusive to justify definite recommendations. It seems probable, however, that less expensive paper can be satisfactorily used in British embassies than has generally been used in American books.

Height of Text

Some tests were made to determine the relative legibility of high and low type. This work must be continued, but present indications are that type set at an inch in height are quite as legible as type set at 1 1/8 inch in height. This may prove an important consideration, if dry printing becomes feasible in international books.

Color of Paper

Results from the books published by the Howe Memorial Press, which paper has been universally used in America in the manufacture of British books. This committee does not wish to encourage the continuance in circulation of British books after they have become so solid as to be objectionable; it seems advisable to the majority of the committee that a slightly tinted paper, which would not further mark somewhat less conspicuous, should be used. This has an economic importance as well, when we enter the field of foreign papers.

Recommendation - The committee on the color of British books will find it hard when the color of the manufacture of British books can be so easily changed.

Following pages

- First - at least one page in each book.
- Second - selecting a line of text and having it printed in large type.
- Third - printing the same text in small type.

Standardization of type in a letter is not only for the benefit of the publisher and printer, but also for the benefit of the reader.

and which seems advisable to the committee, contains a page 10 inches in width by 12 1/2 inches in height. The maximum thickness of the book with this size of page may not be more than one and a half inches, or between 125 and 150 pages of two-side printing. As to interpointing, we find that the reduction of legibility of two-side printing as compared with one-side printing is very slight, retarding the speed of reading on an average of about 2%.

As to the cost of production, there is a saving effected by two-side printing of approximately 50% in the cost of paper and approximately 35% in the cost of binding. The cost of press work is probably about the same in both processes. The cost of interpoint plate making is probably less than 20% in excess of one-side plate making. Assuming that the excess cost is 20%, this difference will soon be absorbed in the other savings.

From the standpoint of the reader, the prime advantage of two-side printing is its reduction of bulk. After the first few copies are printed, however, there is a distinct saving in the cost of production.

RECOMMENDATIONS.

The Committee adopted unanimously the following recommendations:

Dimensions.

That Braille books be published in accordance with the following dimensions:

- a. Size of volume not to exceed 1-1/2 inches in thickness exclusive of covers, and the spread of cover when open not to exceed 22 inches -- except where some peculiarity in the subject matter makes a broader book essential.
- b. Size of page not to exceed 12-1/2 inches in height and 10 inches in width, except where some peculiarity in the subject matter makes a broader page essential. Top and bottom margin not to be less than 1/2 inches.
- c. Length of line not to exceed 8-1/2 inches, except where some peculiarity in the subject matter makes a longer line essential.

Style of Printing.

- a. That Braille books be printed by the inter-pointed method, except where some peculiarity in the subject matter does not lend itself well to the limitations of twoside printing, and except where the use of the books requires that they be printed in a form easily read by sight.
- b. That a method of interpointing be employed which will reduce to a minimum the tangibility of dots on the obverse side of the page.
- c. That printing be done in such a way as to leave as much calendered surface as possible on the paper.

Color of Paper.

That books be printed on a slightly tinted paper.

Style of Binding

That books be bound with a style of binding which will permit of as flat opening as possible, consistent with strength and durability.

That a sub-committee of persons skilled in the methods of Braille embossing followed in America, visit Europe to study and report on the methods of Braille publishing employed abroad, giving special attention to the following subjects:

- a. Processes and materials used in two-side printing.
- b. Machinery used for Braille writing and printing.
- c. Styles of maps used abroad and methods of producing them.
- d. Tangible appliances used in mathematics.
- e. Management of libraries for the Blind in Europe, with a view to ascertaining, if possible, ways and means of increasing the circulation of embossed books used by the Blind.

That the Committee continue its investigation into ways and means of reducing the cost of Braille embossing; and that it study the relative legibility of Braille type of various dot spacings, various letter spacings, various line spacings, and various dot heights. That it give special attention to the desirability of publishing Braille books with a uniform letter spacing.

TABLE OF RETARDATION IN READING INTERPOINTED SHEETS - ADULTS

Record No.	Retardation			
	A.	B.	Actual	Percentage
	One-side Min.Sec.	Interpointed Min.Sec.	Sec.	Percent.
3	3-26	4-43	#77	.3747
15	3-17	4-22	#65	.33
111	1-51	2-35	#44	.40
97	4-41	5-21	#40	.1423
101	6-15	6-37	#22	.0584
41	3-40	4-00	#20	.0909
27	1-41	2-00	#19	.1881
13	1-59	2-16	#17	.1428
21	1-17	1-30	#13	.1688
39	3-01	3-13	#12	.0662
75	1-24	1-36	#12	.1428
33	2-04	2-15	#11	.0887
49	1-35	1-46	#11	.1157
57	1-17	1-27	#10	.1297
81	1-36	1-44	#08	.0833
85	2-06	2-13	#07	.0555
87	2-05	2-12	#07	.0545
25	1-51	1-57	#06	.0540
45	2-20	2-26	#06	.0428
77	1-11	1-17	#06	.0845
95	1-00	1-05	#05	.0833
105	2-22	3-27	#05	.0247
79	1-10	1-15	#05	.0714
43	1-03	1-08	#05	.0793
89	1-04	1-07	#03	.0468
51	-48	-51	#03	.0625
83	2-01	2-04	#02	.0247
103	4-18	4-20	#02	.0077 - - Median
65	2-44	2-45	#01	.0067
67	1-44	1-44	0	.0
47	-54	-54	0	.0
53	2-10	2-10	0	.0
7	2-05	2-04	-01	.0080
37	3-55	3-53	-02	.0085
107	2-28	2-25	-03	.0202
63	1-11	1-07	-04	.0563
91	1-17	1-13	-04	.0519
55	1-32	1-27	-05	.1543
1	3-45	3-40	-05	.0204
5	1-10	1-04	-06	.0857
109	2-46	2-40	-06	.0361
35	3-13	3-07	-06	.0310
17	5-25	5-15	-10	.0307
31	1-36	1-26	-10	.1041
19	4-17	4-07	-10	.0389
29	1-22	1-11	-11	.1341
59	4-26	4-09	-17	.0639
71	2-30	2-12	-18	.1200
9	2-03	1-45	-18	.1463
69	2-52	2-31	-21	.1215
73	2-55	2-30	-25	.1428
99	3-00	2-32	-28	.1555
11	2-26	1-54	-32	.2191
23	8-10	7-30	-40	.0816
61	3-15	2-25	-50	.2564
93	3-53	2-57	-56	.2403

Note: The minus sign indicates that B was read faster than A.

APPENDIX "B"

TABLE OF RETARDATION IN READING INTERPOINTED SHEETS - CHILDREN

Record No.	Retardation			
	A.	B.	Actual	Percentage
	One side Min. Sec.	Interpointed Min. Sec.	Sec.	Percent.
44	2-34	4-41	#127	.8247
70	3-37	4-25	#48	.2211
46	7-34	8-21	#47	.1035
64	2-28	2-52	#24	.1621
18	1-46	2-08	#22	.2075
90	1-04	1-25	#21	.3265
10	2-09	2-29	#20	.1550
98	-21	1-36	#15	.1851
22	-45	-59	#14	.31
16	1-17	1-30	#13	.169
104	2-26	2-35	#09	.0616
12	-45	-54	#09	.20
50	1-03	1-12	#09	.1428
52	1-01	1-10	#09	.1475
42	-50	-57	#07	.1400
76	-55	1-01	#06	.1090
6	-52	-57	#05	.0961
100	1-05	1-10	#05	.0769
24	2-02	2-06	#04	.0327
32	1-37	1-41	#04	.0412
38	1-00	1-04	#04	.0666
20	1-52	1-55	#03	.0267
28	1-15	1-17	#02	.0266
8	1-59	2-01	#02	.0168
68	2-05	2-07	#02	.0160
80	4-13	4-15	#02	.0079 - - Median
72	2-22	2-23	#01	.0070
88	-49	-49	0	.0
66	5-00	5-00	0	.0
102	-59	-58	-01	.0169
30	1-06	1-05	-01	.0151
14	1-06	1-05	-01	.0151
26	1-46	1-45	-01	.0094
48	1-12	1-10	-02	.0277
4	-49	-47	-02	.0408
34	-52	-49	-03	.0574
96	1-21	1-18	-03	.0370
62	2-37	2-34	-03	.0191
58	1-04	1-00	-04	.0625
82	2-50	2-46	-04	.0235
78	-47	-42	-05	.1063
60	-47	-42	-05	.1063
56	1-45	1-40	-05	.0476
92	3-04	2-57	-07	.0380
40	-54	-45	-09	.1666
84	5-16	5-05	-11	.0344
36	1-11	-58	-13	.1830
54	1-15	1-01	-14	.1866
94	2-32	2-18	-14	.0921
86	1-52	1-29	-23	.2053
74	3-39	3-13	-26	.1187
2	2-43	2-15	-28	.1717

Note: The minus sign indicates that B was read faster than A.

CONSOLIDATED TABLE OF RETARDATION IN READING INTERPOINTED SHEETS

Record No.	Retardation			
	A.	B.	Actual	Percentage
	One-side Min. Sec.	Interpointed Min. Sec.	Sec.	Percent
44	2-34	4-41	#127	.8247
3	3-26	4-43	#77	.3747
15	3-17	4-22	#65	.33
70	3-37	4-25	#48	.2211
46	7-34	8-21	#47	.1035
111	1-51	2-35	#44	.40
97	4-41	5-21	#40	.1423
64	2-28	2-52	#24	.1621
101	6-15	6-37	#22	.0584
18	1-46	2-08	#22	.2075
90	1-04	1-25	#21	.3265
41	3-40	4-00	#20	.0909
10	2-09	2-29	#20	.1550
27	1-41	2-00	#19	.1881
13	1-59	2-16	#17	.1428
98	1-21	1-36	#15	.1851
22	-45	-59	#14	.31
21	1-17	1-30	#13	.1688
16	1-17	1-30	#13	.169
39	3-01	3-13	#12	.0662
75	1-24	1-36	#12	.1428
33	2-04	2-15	#11	.0887
49	1-35	1-46	#11	.1157
57	1-17	1-27	#10	.1297
104	2-26	2-35	#09	.0616
12	-45	-54	#09	.20
50	1-03	1-12	#09	.1428
52	1-01	1-10	#09	.1475
81	1-36	1-44	#08	.0833
85	2-06	2-13	#07	.0555
87	2-05	2-12	#07	.0545
42	-50	-57	#07	.1400
25	1-51	1-57	#06	.0540
45	2-20	2-26	#06	.0428
77	1-11	1-17	#06	.0845
76	-55	1-01	#06	.1090
95	1-00	1-05	#05	.0833
105	2-22	3-27	#05	.0247
79	1-16	1-15	#05	.0714
6	-52	-57	#05	.0961
43	1-03	1-08	#05	.0793
100	1-05	1-10	#05	.0769
24	2-02	2-06	#04	.0327
32	1-37	1-41	#04	.0412
38	1-00	1-04	#04	.0666
20	1-52	1-55	#03	.0267
89	1-04	1-07	#03	.0468
51	-48	-51	#03	.0625
83	2-01	2-04	#03	.0247
28	1-15	1-17	#02	.0266
8	1-59	2-01	#02	.0168
68	2-05	2-07	#02	.0160
80	4-13	4-15	#02	.0079
103	4-18	4-20	#02	.0077
72	2-22	2-23	#01	.0070
65	2-44	2-45	#01	.0067

Median-
Children
Medium-
Adults

67	1-44	1-44	0	.0
47	-54	-54	0	.0
88	-49	-49	0	.0
53	2-10	2-10	0	.0
66	5-00	5-00	0	.0
102	-59	-58	-01	.0169
30	1-06	1-05	-01	.0151
14	1-06	1-05	-01	.0151
26	1-46	1-45	-01	.0094
7	2-05	2-04	-01	.0080
48	1-12	1-10	-02	.0277
37	3-55	3-53	-02	.0085
4	-49	-47	-02	.0408
34	-52	-49	-03	.0574
96	1-21	1-18	-03	.0370
107	2-28	2-25	-03	.0202
62	2-37	2-34	-03	.0191
58	1-04	1-00	-04	.0625
63	1-11	1-07	-04	.0563
91	1-17	1-13	-04	.0519
82	2-50	2-46	-04	.0235
78	-47	-42	-05	.1063
60	-47	-42	-05	.1063
55	1-32	1-27	-05	.0543
56	1-45	1-40	-05	.0476
1	3-45	3-40	-05	.0204
5	1-10	1-04	-06	.0857
109	2-46	2-40	-06	.0361
35	3-13	3-07	-06	.0310
92	3-04	2-57	-07	.0380
40	-54	-45	-09	.1666
17	5-25	5-15	-10	.0307
31	1-36	1-26	-10	.1041
19	4-17	4-07	-10	.0389
29	1-22	1-11	-11	.1341
84	5-16	5-05	-11	.0344
36	1-11	-58	-13	.1830
54	1-15	1-01	-14	.1866
94	2-32	2-18	-14	.0921
59	4-26	4-09	-17	.0639
71	2-30	2-12	-18	.1200
9	2-03	1-45	-18	.1463
69	2-52	2-31	-21	.1215
86	1-52	1-29	-23	.2053
73	2-55	2-30	-25	.1428
74	3-39	3-13	-26	.1187
2	2-43	2-15	-28	.1717
99	3-00	2-32	-28	.1555
11	2-26	1-54	-32	.2191
23	8-10	7-30	-40	.0816
61	3-15	2-25	-50	.2564
93	3-53	2-57	-56	.2403

Note: In record numbers, even numbers indicate children; odd numbers adults.
The minus sign indicates that B was read faster than A.

APPENDIX "D"

TABLE OF PERCENTAGE OF RETARDATION IN READING INTERPOINTED SHEETS - ADULTS

Record No.	A.	B.	Percentage
	One side	Interpointed	
	Min. Sec.	Min. Sec.	
111	1-51	2-35	#.40
3	3-26	4-43	#.3747
15	3-17	4-22	#.33
27	1-41	2-00	#.1881
21	1-17	1-30	#.1688
13	1-59	2-16	#.1428
75	1-24	1-36	#.1428
97	4-41	5-21	#.1423
57	1-17	1-27	#.1297
49	1-35	1-46	#.1157
41	3-40	4-00	#.0909
33	2-04	2-15	#.0887
77	1-11	1-17	#.0845
81	1-36	1-44	#.0833
95	1-00	1-05	#.0833
43	1-03	1-08	#.0793
79	1-10	1-15	#.0714
39	3-01	3-13	#.0662
51	-48	-51	#.0625
101	6-15	6-37	#.0584
85	2-06	2-13	#.0555
87	2-05	2-12	#.0545
25	1-51	1-57	#.0540
89	1-04	1-07	#.0468
45	2-20	2-26	#.0428
105	3-22	3-27	#.0247
83	2-01	2-04	#.0247
103	4-18	4-20	#.0077 - Median
65	2-44	2-45	#.0067
67	1-44	1-44	0
53	2-10	2-10	0
47	-54	-54	0
7	2-05	2-04	-.0080
37	3-55	3-53	-.0085
107	2-28	2-25	-.0202
1	3-45	3-40	-.0204
17	5-25	5-15	-.0307
35	3-13	3-07	-.0310
109	2-46	2-40	-.0361
19	4-17	4-07	-.0389
91	1-17	1-13	-.0519
55	1-32	1-27	-.0543
63	1-11	1-07	-.0563
59	4-26	4-09	-.0639
23	8-10	7-30	-.0816
5	1-10	1-04	-.0857
31	1-36	1-26	-.1041
71	2-30	2-12	-.1200
69	2-52	2-31	-.1215
29	1-22	1-11	-.1341
73	2-55	2-30	-.1428
9	2-03	1-45	-.1463
99	3-00	2-32	-.1555
11	2-26	1-54	-.2191
93	3-53	2-57	-.2403
61	3-15	2-25	-.2564

Note: The minus sign indicates that B was read faster than A.

APPENDIX "E"

TABLE OF PERCENTAGE OF RETARDATION IN READING INTERPOINTED SHEETS - CHILDREN

Record No.	A.	B.	Percentage
	One side	Interpointed	
	<u>Min.</u> <u>Sec.</u>	<u>Min.</u> <u>Sec.</u>	
44	2-34	4-41	#.8247
90	1-04	1-25	#.3265
22	-45	-59	#.31
70	3-37	4-25	#.2211
18	1-46	2-08	#.2075
12	-45	-54	#.20
98	1-21	1-36	#.1851
16	1-17	1-30	#.169
64	2-28	2-52	#.1621
10	2-09	2-29	#.1550
52	1-01	1-10	#.1475
50	1-03	1-12	#.1428
42	-50	-57	#.1400
76	-55	1-01	#.1090
46	7-34	8-21	#.1035
6	-52	-57	#.0961
100	1-05	1-10	#.0769
38	1-00	1-04	#.0666
104	2-26	2-35	#.0616
32	1-37	1-41	#.0412
24	2-02	2-06	#.0327
20	1-52	1-55	#.0267
28	1-15	1-17	#.0266
8	1-59	2-01	#.0168
68	2-05	2-07	#.0160
80	4-13	4-15	#.0079 - - Median
72	2-22	2-23	#.0070
88	-49	-49	0
66	5-00	5-00	0
26	1-46	1-45	-.0094
30	1-06	1-05	-.0151
14	1-06	1-05	-.0151
102	-59	-58	-.0169
62	2-37	2-34	-.0191
82	2-50	2-46	-.0235
48	1-12	1-10	-.0277
84	5-16	5-05	-.0344
96	1-21	1-18	-.0370
92	3-04	2-57	-.0380
4	-49	-47	-.0408
56	1-45	1-40	-.0476
34	-52	-49	-.0574
58	1-04	1-00	-.0625
94	2-32	2-18	-.0921
78	-47	-42	-.1063
60	-47	-42	-.1063
74	3-39	3-13	-.1187
40	-54	-45	-.1666
2	2-43	2-15	-.1717
36	1-11	-58	-.1830
54	1-15	1-01	-.1866
86	1-52	1-29	-.2053

Note: The minus sign indicates that B was read faster than A.

CONSOLIDATED TABLE OF PERCENTAGE OF RETARDATION IN READING INTERPOINTED SHEETS

Record No.	A.	B.	Percentage
	One side Min. Sec.	Interpointed Min. Sec.	
44	2-34	4-41	#.8247
111	1-51	2-35	#.40
3	3-26	4-43	#.3747
15	3-17	4-22	#.33
90	1-04	1-25	#.3265
22	-45	-59	#.31
70	3-37	4-25	#.2211
18	1-46	2-08	#.2075
12	-45	-54	#.20
27	1-41	2-00	#.1881
98	1-21	1-36	#.1851
16	1-17	1-30	#.169
21	1-17	1-30	#.1688
64	2-28	2-52	#.1621
10	2-09	2-29	#.1550
52	1-01	1-10	#.1475
13	1-59	2-16	#.1428
75	1-24	1-36	#.1428
50	1-03	1-12	#.1428
97	4-41	5-21	#.1423
42	-50	-57	#.1400
57	1-17	1-27	#.1297
49	1-35	1-46	#.1157
76	-55	1-01	#.1090
46	7-34	8-21	#.1035
6	-52	-57	#.0961
41	3-40	4-00	#.0909
33	2-04	2-15	#.0887
77	1-11	1-17	#.0845
81	1-36	1-44	#.0833
95	1-00	1-05	#.0833
43	1-03	1-08	#.0793
100	1-05	1-10	#.0769
79	1-10	1-15	#.0714
38	1-00	1-04	#.0666
39	3-01	3-13	#.0662
51	-48	-51	#.0625
104	2-26	2-35	#.0616
101	6-15	6-37	#.0584
85	2-06	2-13	#.0555
87	2-05	2-12	#.0545
25	1-51	1-57	#.0540
89	1-04	1-07	#.0468
45	2-20	2-26	#.0428
32	1-37	1-41	#.0412
24	2-02	2-06	#.0327
20	1-52	1-55	#.0267
28	1-15	1-17	#.0266
105	3-22	3-27	#.0247
83	2-01	2-04	#.0247
8	1-59	2-01	#.0168
68	2-05	2-07	#.0160
80	4-13	4-15	#.0079 - Median - Children
103	4-18	4-20	#.0077 - Median - Adults
72	2-22	2-23	#.0070
65	2-44	2-45	#.0067
67	1-44	1-44	0
53	2-10	2-10	0
47	-54	-54	0
88	-49	-49	0
66	5-00	5-00	0
7	2-05	2-04	-.0080
37	3-55	3-53	-.0085
26	1-46	1-45	-.0094
30	1-06	1-05	-.0151
14	1-06	1-05	-.0151
102	-59	-58	-.0169
62	2-37	2-34	-.0191
107	2-28	2-25	-.0202
1	3-45	3-40	-.0204
82	2-50	2-46	-.0235
48	1-12	1-10	-.0277
17	5-25	5-15	-.0307
35	3-13	3-07	-.0310
84	5-16	5-05	-.0344
109	2-46	2-40	-.0361
96	1-21	1-18	-.0370
92	3-04	2-57	-.0380
19	4-17	4-07	-.0389
4	-49	-47	-.0408
56	1-45	1-40	-.0476
91	1-17	1-13	-.0519
55	1-32	1-27	-.0543
63	1-11	1-07	-.0563
34	-52	-49	-.0574
58	1-04	1-00	-.0625
59	4-26	4-09	-.0639
23	8-10	7-30	-.0816
5	1-10	1-04	-.0857
94	2-32	2-18	-.0921
31	1-36	1-26	-.1041
78	-47	-42	-.1063
60	-47	-42	-.1063
74	3-39	3-13	-.1187
71	2-30	2-12	-.1200
69	2-52	2-31	-.1215
29	1-22	1-11	-.1341
73	2-55	2-30	-.1428
9	2-03	1-45	-.1463
99	3-00	2-32	-.1555
40	-54	-45	-.1666
2	2-43	2-15	-.1717
36	1-11	-58	-.1830
54	1-15	1-01	-.1866
86	1-52	1-29	-.2053
11	2-26	1-54	-.2191
93	3-53	2-57	-.2403
61	3-15	2-25	-.2564

Note: In record numbers, even numbers indicate children; odd numbers adults.
The minus sign indicates that B was read faster than A.

APPENDIX "C"

TABLE SHOWING PERCENTAGE OF RETARDATION IN READING INTERPOINTED SHEETS
WHEN "A" WAS READ FIRST

Record No.	A.	B.	Percentage
	One side	Interpointed	
	Min. Sec.	Min. Sec.	
44	2-34	4-41	#.8247
111	1-51	2-35	#.40
3	3-26	4-43	#.3747
15	3-17	4-22	#.33
12	-45	-54	#.20
27	1-41	2-00	#.1881
16	1-17	1-30	#.169
64	2-28	2-52	#.1621
52	1-01	1-10	#.1475
75	1-24	1-36	#.1428
95	1-00	1-05	#.0833
100	1-05	1-10	#.0769
79	1-10	1-15	#.0714
39	3-01	3-13	#.0662
51	-48	-51	#.0625
87	2-05	2-12	#.0545
32	1-37	1-41	#.0412
24	2-02	2-06	#.0327
20	1-52	1-55	#.0267
28	1-15	1-17	#.0266
83	2-01	2-04	#.0247
68	2-05	2-07	#.0160
103	4-18	4-20	#.0077
65	2-44	2-45	#.0067
53	2-10	2-10	.0
47	-54	-54	.0
7	2-05	2-04	-.0080-Median
37	3-55	3-53	-.0085
14	1-06	1-05	-.0151
102	-59	-58	-.0169
107	2-28	2-25	-.0202
82	2-50	2-46	-.0235
48	1-12	1-20	-.0277
35	3-13	3-07	-.0310
96	1-21	1-18	-.0370
92	3-04	2-57	-.0380
19	4-17	4-07	-.0389
56	1-45	1-40	-.0476
91	1-17	1-13	-.0519
55	1-32	1-27	-.0543
59	4-26	4-09	-.0639
23	8-10	7-30	-.0816
31	1-36	1-26	-.1041
78	-47	-42	-.1063
60	-47	-42	-.1063
74	3-39	3-13	-.1187
69	2-52	2-31	-.1215
99	3-00	2-32	-.1555
40	-54	-45	-.1666
2	2-43	2-15	-.1717
36	1-11	-58	-.1830
86	1-52	1-29	-.2053
11	2-26	1-54	-.2191

Note: The minus sign indicates that B was read faster than A.
In record numbers, even numbers indicate children; odd numbers adults.

APPENDIX "E"

TABLE SHOWING PERCENTAGE OF RETARDATION IN READING INTERPOINTED SHEETS
WHEN "B" WAS READ FIRST

Record No.	A.	B.	Percentage
	One-side	Interpointed	
	Min.Sec.	Min.Sec.	
90	1-04	1-25	#.3265
22	-45	-59	#.31
70	3-37	4-25	#.2211
18	1-46	2-08	#.2075
98	1-21	1-36	#.1851
21	1-17	1-30	#.1688
10	2-09	2-29	#.1550
13	1-59	2-16	#.1428
50	1-03	1-12	#.1428
97	4-41	5-21	#.1423
42	-50	-57	#.1400
57	1-17	1-27	#.1297
49	1-35	1-46	#.1157
76	-55	1-01	#.1090
46	7-34	8-21	#.1035
6	-52	-57	#.0961
41	3-40	4-00	#.0909
33	2-04	2-15	#.0887
77	1-11	1-17	#.0845
81	1-36	1-44	#.0833
43	1-03	1-08	#.0793
38	1-00	1-04	#.0666
104	2-26	2-35	#.0616
101	6-15	6-37	#.0584
85	2-06	2-13	#.0555
25	1-51	1-57	#.0540
89	1-04	1-07	#.0468
45	2-20	2-26	#.0428 - - Median
105	3-22	3-27	#.0247
8	1-59	2-01	#.0168
80	4-13	4-15	#.0079
72	2-22	2-23	#.0070
67	1-44	1-44	.0
88	-49	-49	.0
66	5-00	5-00	.0
26	1-46	1-45	-.0094
30	1-06	1-05	-.0151
62	2-37	2-34	-.0191
1	3-45	3-40	-.0204
17	5-25	5-15	-.0307
84	5-16	5-05	-.0344
109	2-46	2-40	-.0361
4	-49	-47	-.0408
63	1-11	1-07	-.0563
34	-52	-49	-.0574
58	1-04	1-00	-.0625
5	1-10	1-04	-.0857
94	2-32	2-18	-.0921
71	2-30	2-12	-.1200
29	1-22	1-11	-.1341
73	2-55	2-30	-.1428
9	2-03	1-45	-.1463
54	1-15	1-01	-.1866
93	3-53	2-57	-.2403
61	3-15	2-25	-.2564

Note: The minus sign indicates that B was read faster than A.
In record numbers, even numbers indicate children; odd numbers adults.

APPENDIX "I"

TABLE SHOWING SPEED AND ERRORS-ADULTS

Record No.	Time to read A.	Errors
51	-48	0
47	-54	0
95	1-00	0
43	1-03	4
89	1-04	1
5	1-10	0
79	1-10	1
77	1-11	0
63	1-11	1
91	1-17	1
21	1-17	2
57	1-17	8
29	1-22	2
75	1-24	1
55	1-32	0
49	1-35	0
81	1-36	4
31	1-36	1
27	1-41	3
67	1-44	0
111	1-51	0
25	1-51	2
13	1-59	7
83	2-01	0
9	2-03	0
33	2-04	2
7	2-05	0
87	2-05	0
85	2-06	7
53	2-10	0
45	2-20	1
11	2-26	4
107	2-28	0
71	2-30	3
65	2-44	2
109	2-46	0
69	2-52	5
73	2-55	3
99	3-00	0
39	3-01	1
35	3-13	2
61	3-15	1
15	3-17	1
105	3-22	6
3	3-26	0
41	3-40	0
1	3-45	0
93	3-53	3
37	3-55	6
19	4-17	0
103	4-18	6
59	4-26	5
97	4-41	0
17	5-25	0
101	6-15	0
23	8-10	0

RECORDS OF THE DISTRICT COURT OF THE DISTRICT OF COLUMBIA

Case No.	Plaintiff	Defendant
10	John A. Smith	John A. Smith
11	John A. Smith	John A. Smith
12	John A. Smith	John A. Smith
13	John A. Smith	John A. Smith
14	John A. Smith	John A. Smith
15	John A. Smith	John A. Smith
16	John A. Smith	John A. Smith
17	John A. Smith	John A. Smith
18	John A. Smith	John A. Smith
19	John A. Smith	John A. Smith
20	John A. Smith	John A. Smith
21	John A. Smith	John A. Smith
22	John A. Smith	John A. Smith
23	John A. Smith	John A. Smith
24	John A. Smith	John A. Smith
25	John A. Smith	John A. Smith
26	John A. Smith	John A. Smith
27	John A. Smith	John A. Smith
28	John A. Smith	John A. Smith
29	John A. Smith	John A. Smith
30	John A. Smith	John A. Smith
31	John A. Smith	John A. Smith
32	John A. Smith	John A. Smith
33	John A. Smith	John A. Smith
34	John A. Smith	John A. Smith
35	John A. Smith	John A. Smith
36	John A. Smith	John A. Smith
37	John A. Smith	John A. Smith
38	John A. Smith	John A. Smith
39	John A. Smith	John A. Smith
40	John A. Smith	John A. Smith
41	John A. Smith	John A. Smith
42	John A. Smith	John A. Smith
43	John A. Smith	John A. Smith
44	John A. Smith	John A. Smith
45	John A. Smith	John A. Smith
46	John A. Smith	John A. Smith
47	John A. Smith	John A. Smith
48	John A. Smith	John A. Smith
49	John A. Smith	John A. Smith
50	John A. Smith	John A. Smith
51	John A. Smith	John A. Smith
52	John A. Smith	John A. Smith
53	John A. Smith	John A. Smith
54	John A. Smith	John A. Smith
55	John A. Smith	John A. Smith
56	John A. Smith	John A. Smith
57	John A. Smith	John A. Smith
58	John A. Smith	John A. Smith
59	John A. Smith	John A. Smith
60	John A. Smith	John A. Smith
61	John A. Smith	John A. Smith
62	John A. Smith	John A. Smith
63	John A. Smith	John A. Smith
64	John A. Smith	John A. Smith
65	John A. Smith	John A. Smith
66	John A. Smith	John A. Smith
67	John A. Smith	John A. Smith
68	John A. Smith	John A. Smith
69	John A. Smith	John A. Smith
70	John A. Smith	John A. Smith
71	John A. Smith	John A. Smith
72	John A. Smith	John A. Smith
73	John A. Smith	John A. Smith
74	John A. Smith	John A. Smith
75	John A. Smith	John A. Smith
76	John A. Smith	John A. Smith
77	John A. Smith	John A. Smith
78	John A. Smith	John A. Smith
79	John A. Smith	John A. Smith
80	John A. Smith	John A. Smith
81	John A. Smith	John A. Smith
82	John A. Smith	John A. Smith
83	John A. Smith	John A. Smith
84	John A. Smith	John A. Smith
85	John A. Smith	John A. Smith
86	John A. Smith	John A. Smith
87	John A. Smith	John A. Smith
88	John A. Smith	John A. Smith
89	John A. Smith	John A. Smith
90	John A. Smith	John A. Smith
91	John A. Smith	John A. Smith
92	John A. Smith	John A. Smith
93	John A. Smith	John A. Smith
94	John A. Smith	John A. Smith
95	John A. Smith	John A. Smith
96	John A. Smith	John A. Smith
97	John A. Smith	John A. Smith
98	John A. Smith	John A. Smith
99	John A. Smith	John A. Smith
100	John A. Smith	John A. Smith

APPENDIX "J"

TABLE SHOWING SPEED AND ERRORS - CHILDREN

<u>Record No.</u>	<u>Time to read A.</u>	<u>Errors.</u>
12	-45	0
22	-45	1
60	-47	1
78	-47	3
88	-49	0
4	-49	0
42	-50	0
34	-52	3
6	-52	0
40	-54	0
76	-55	0
102	-59	0
38	1-00	0
52	1-01	0
50	1-03	0
58	1-04	0
90	1-04	0
100	1-05	1
14	1-06	1
30	1-06	0
36	1-11	3
48	1-12	1
28	1-15	0
54	1-15	0
16	1-17	2
98	1-21	0
96	1-21	1
32	1-37	1
56	1-45	5
26	1-46	1
18	1-46	4
20	1-52	0
86	1-52	1
8	1-59	1
24	2-02	3
68	2-05	0
10	2-09	2
72	2-22	4
104	2-26	3
64	2-28	5
94	2-32	0
44	2-34	0
62	2-37	0
2	2-43	0
82	2-50	0
92	3-04	5
70	3-37	0
74	3-39	2
80	4-13	1
66	5-00	0
84	5-16	0
46	7-34	1

APPENDIX VII
CONSOLIDATED TABLE SHOWING SPEED AND ERRORS.

Record No.	Time to read A.	Errors
12	-45	0
22	-45	1
60	-47	1
78	-47	3
51	-48	0
88	-49	0
4	-49	0
42	-50	0
34	-52	3
6	-52	0
40	-54	0
47	-54	0
76	-55	0
102	-59	0
95	1-00	0
38	1-00	0
52	1-01	0
43	1-03	4
50	1-03	0
58	1-04	0
90	1-04	0
89	1-04	1
100	1-05	1
14	1-06	1
30	1-06	0
5	1-10	0
79	1-10	1
36	1-11	3
77	1-11	0
63	1-11	1
48	1-12	1
28	1-15	0
54	1-15	0
91	1-17	1
16	1-17	2
21	1-17	2
57	1-17	8
98	1-21	0
96	1-21	1
29	1-22	2
75	1-24	1
55	1-32	0
49	1-35	0
81	1-36	4
31	1-36	1
32	1-37	1
27	1-41	3
67	1-44	0
56	1-45	5
26	1-46	1
18	1-46	4
111	1-51	0
25	1-51	2
20	1-52	0
86	1-52	1
8	1-59	1
13	1-59	7
18	2-01	0
24	2-02	3
9	2-03	0
33	2-04	2
7	2-05	0
87	2-05	0
68	2-05	0
85	2-06	7
10	2-09	2
53	2-10	0
45	2-20	1
72	2-22	4
104	2-26	3
11	2-26	4
64	2-28	5
107	2-28	0
71	2-30	3
94	2-32	0
44	2-34	0
62	2-37	0
2	2-43	0
65	2-44	2
109	2-46	0
82	2-50	0
69	2-52	5
73	2-55	3
99	3-00	0
39	3-01	1
92	3-04	5
35	3-13	2
61	3-15	1
15	3-17	1
105	3-22	6
3	3-26	0
70	3-37	0
74	3-39	2
41	3-40	0
1	3-45	0
93	3-53	3
37	3-55	6
80	4-13	1
19	4-17	0
103	4-18	6
59	4-26	5
97	4-41	0
66	5-00	0
84	5-16	0
17	5-25	0
101	6-15	0
46	7-34	1
23	8-10	0

Note: In record numbers, even numbers indicate children; odd numbers adults.

APPENDIX "L"

COMPARATIVE SPEED OF FAST AND SLOW READERS.

Total Children and Adult.

Fastest 25% read in	25 min.	42 sec.
Slowest 25% " " "	113 "	29 "
Difference -	87 min.	47 sec. or 3.42% of fast readers total time.
Average speed for fastest 25% is	57.11 sec.	
" " " slowest 25% "	252.18 " or 4 min.	12.18 sec.
Average difference	195.07 " or 3 "	15.07 "

Adults.

Fastest 25% read in	16 min.	8 sec.
Slowest 25% " " "	62 "	50 "
Difference -	46 "	42 " or 2.89% of fast readers total time
Average speed for fastest 25% is	69.15 sec.	or 1 min. 9.15 sec.
Average " " " slowest 25% "	269.28 " " 4 "	29.28 "
Average difference	200.13 " " 3 "	20.13 "

Children.

Fastest 25% read in	11 min.	4 sec.
Slowest 25% " " "	48 "	7 "
Difference	37 "	3 " or 3.35% of fast readers total time.
Average speed for fastest 25% is	51.08 sec.	
" " " slowest 25% "	222.08 " or 3 min.	42.08 sec.
Average difference	171.00 " " 2 "	51 "

1. 1000 1000 1000

1000 1000 1000

1000 1000 1000

1000 1000 1000

1000 1000 1000

1000 1000 1000

1000 1000 1000

1000 1000 1000

1000 1000 1000

1000 1000 1000

DATA ON INEXPERIENCED READERS.

Eliminating those known to be inexperienced readers - 12 in number (8 children and 4 adults) we find that the total difference between length of time required to read A and B is 3 min. 22 sec., or a retardation of .0171%.

By eliminating the 8 inexperienced readers among children from total of children's records, we find that the retardation of B over A is 2 min. 40 sec. or a retardation of .0354%.

Among adult readers we have but 4 subjects which is too small a number to be indicative of any tendency. It happens that in the case of these 4 readers the A sheet was read in 21 min. 42 sec. and the B sheet in 20 min. 46 sec. or a retardation of minus 56 sec. Three of the 4 readers started with A. The one who started with B read A in 22 sec. less time than B.

An inspection of these 4 subjects denotes a certain advantage in point of speed of the second page read over the first page. This is conceivably due to learning element though the factor is not constant.

In case of 8 inexperienced readers among children, 4 began with A and 4 with B. Thus whatever advantage may result from the learning element, if any, is equally divided between the two forms of printing. Inspection of these records shows nothing constant in the learning element.

APPENDIX "N"

As inquiries have been made as to where persons taking these tests learned to read Braille, we are giving below the following data:

CHILDREN

- 37 - Learned to read Braille in New York City Public Schools.
- 5 - " " " " " " New York Institute for the Blind.
- 8 - " " " " " " Cleveland Public Schools.
- 2 - " " " " " " Newark, N. J. Public Schools.

ADULTS

- 12 - Learned to read Braille in New York City Public Schools.
- 10 - " " " " " " New York Institute for the Blind.
- 1 - " " " " " " Port Jefferson, N. Y. Public Schools.
- 3 - Self taught.

- 12 - No record obtained.
- 18 - " " " "

It should be said that when a subject stated that he was more familiar with American Braille than with Revised Braille, he took the test in American Braille.

2

SECOND SIDE

Dated July 31, 1924.

HV1669 REPORT OF THE AMERICAN c.1
A FOUNDATION FOR THE BLIND
COMMITTEE ON THE REDUCTION OF
COST OF BRAILLE PUBLISHING.

Date Due (1924)

HV1669

c.1

A
REPORT OF THE AMERICAN FOUNDATION
FOR THE BLIND COMMITTEE ON THE
REDUCTION OF COST OF BRAILLE
PUBLISHING. (1924)

DATE

ISSUED TO

Reference Copy

AMERICAN FOUNDATION FOR THE BLIND
15 WEST 16th STREET
NEW YORK, N. Y. 10011

Printed in U.S.A.

Bno-Dart INDUSTRIES

Newark, N. J. - Los Angeles 25, Calif.
Toronto 6, Ontario

Made in U.S.A.

